

questionnaire regarding their medical care and self management. Medications (within the last 7 days), physical examination and laboratory tests were documented. DDMP participation was validated by the primary physician. Only DM2s with statutory health insurance and validated DDMP enrolment were included in the analysis ( $n = 166$ ). Regression analyses adjusting for confounders (age, sex, education, diabetes duration and previous diabetes complications) were conducted. **RESULTS:** DDMP enrollees ( $n = 89$ ) reported medical examination of eyes and feet and medical advice regarding diet and physical activity more frequently ( $p < 0.005$ ), received antidiabetic and antihypertensive medications more often ( $p < 0.05$ ) and attended diabetes education more frequently ( $p < 0.005$ ). DDMP enrollees measured their blood pressure more frequently ( $p < 0.05$ ). The groups did not differ regarding Hemoglobin A1c (HbA1c), but of 54 DM2s with values over 7%, only 3.6% of DDMP enrollees were receiving no antihyperglycemic medication whereas this was true for 38.5% of those not in DDMP. This difference remained significant ( $p = 0.0129$ ) after adjustment for diabetes duration. **CONCLUSIONS:** According to our study, health care quality in DDMPs is improved. However, patient self-management of all diabetics must be improved.

**PDB61**

# DIABETES REGIMEN UTILIZATION IN A LARGE MANAGED CARE SETTING; A COMPARISON WITH ADA/EASD CONSENSUS STATEMENT GUIDELINES

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**OBJECTIVES:** Diabetes extracts a considerable economic toll on the US health care system. An analysis conducted in 2007, indicated that the economic burden of diabetes was \$174 billion, with direct medical expenditures accounting for \$116 billion. Originally published in 2006 and updated yearly, the American Diabetes Association (ADA)/European Association for the Study of Diabetes (EASD) Consensus Algorithm for the Initiation and Adjustment of Therapy, stands to guide health care practitioners in determining the most appropriate lifestyle and pharmacotherapeutic interventions for patients with Type 2 diabetes. We conducted an analysis to compare medication regimens from claims adjudicated by patients with Type 2 diabetes to treatment regimens outlined in the ADA/EASD guidelines. **METHODS:** This retrospective claims analysis utilized data from the 2007 MarketScan® Commercial Claims and Encounters and the Medicare Supplemental and Coordination of Benefits databases from Thomson Reuters. Medication regimens were evaluated for patients with Type-2 diabetes and at least one prescription claim for the fourth quarter of 2007. In order to be considered as part of a treatment regimen all medications must have had an overlapping 45 day period of utilization in the quarter. All identified medication regimens were compared to 2008 ADA/EASD consensus guidelines **RESULTS:** A total of 191,535 patients were included in the analysis. In rank order, the top five treatment regimens by utilization frequency were as follows: biguanide monotherapy (27.9%), sulfonylurea monotherapy (14.53%), sulfonylurea+biguanide combination therapy (12.01%), thiazolidinedione monotherapy (9.21%), thiazolidinedione+biguanide combination therapy (6.97%). **CONCLUSIONS:** As expected, following ADA/EASD guidelines, monotherapy with biguanide and a regimen of biguanide+sulfonylurea were among the most frequently utilized regimens. The high degree of sulfonylurea monotherapy utilization may suggest that many patients may not tolerate monotherapy with biguanide. In all cases treatment must be individualized requiring the use of other agents to control blood glucose levels.

**PDB62**

# ECONOMIC IMPACT OF COMPLIANCE AND PERSISTENCE TO TREATMENT WITH ANTIDIABETES MEDICATION IN T2DM—A SYSTEMATIC REVIEW

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**OBJECTIVES:** Suboptimal compliance and failure to persist with antidiabetes therapies are of potential economic significance. The present research aims to review the recent literature regarding the impact of poor compliance and persistence with antidiabetes medications on the cost of health care or its components for patients with type 2 diabetes mellitus (T2DM). **METHODS:** Systematic literature search was conducted in pubmed for relevant articles published in the period between January 1, 2000 and April 30, 2009. Studies describing economic consequence of compliance and/or persistence with pharmaceutical antidiabetes treatment were identified. **RESULTS:** Of 449 articles corresponding to the primary search algorithm, 12 studies (all conducted in USA) fulfilled inclusion criteria regarding the economic impact of compliance and/or persistence with treatment on the overall cost of T2DM care or its components. Compliance was assessed via medication possession ratio (MPR) in 10 studies, and ranged from 0.52 to 0.93 depending on regimen. Persistence was assessed in one study. Mean total annual costs per patient having T2DM varied between the studies, ranging from \$4,570 to \$17,338. In 7 studies medication compliance was inversely associated with total health care costs, while in four other studies inverse associations between medication compliance and hospitalisation costs were reported. In one study increased adherence did not change overall health care costs. **CONCLUSIONS:** Improved compliance can lead to reductions of the total health care costs in T2DM, mainly through decrease in hospitalisations. Studies assessing economic impact of persistence with pharmacotherapy in T2DM are limited, and studies investigating cost consequences of compliance are predominantly using MPR as a measure of compliance. Further

research is needed in countries other than USA to assess impact of compliance and persistence to pharmacotherapy on T2DM costs in country-specific settings. Researchers should follow definitions of compliance and persistence proposed by the ISPOR Medication Compliance and Persistence Special Interest Group.

**PDB63**

# THE UTILIZATION OF ROSIGLITAZONE AND PIOGLITAZONE AFTER THE CARDIOVASCULAR RISK-WARNINGS: WAS THERE A DIFFERENTIAL EFFECT?

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**OBJECTIVES:** Meta-Analyses of oral hypoglycemic agents (OHA) revealed that Rosiglitazone (Rosi) increased the risk of Myocardial Infarction (MI) and Heart Failure (HF), and Pioglitazone (Pio) increased the risk of HF and decreased the risk of MI. The objective of this research is to compare OHA utilization patterns, before and after these publications. **METHODS:** CareFirst BlueCross BlueShield's claims were analyzed for patients continuously enrolled from January 2005 through December 2007 who started on mono-Rosi or mono-Pio. The "pre-publication" period (November 1, 2006—March 31, 2007) was compared to the "post-publication" period (July 1, 2007—December 1, 2007) using a difference-in-difference approach. Multinomial logistic regression (MLR) explored discontinuation; continuation with monotherapy or adding another drug; and switching after adjusting for gender, age, type of insurance, history of MI or HF and risk factors for MI and HF. **RESULTS:** The number of monotherapy Rosi users decreased from the pre ( $N = 368$ , 5.94%) to post ( $N = 170$ , 2.87%) period, while monotherapy Pio use was stable across the two periods. The proportion who switched from Rosi to non-Rosi drugs changed from 2.17% in pre-period to 5.88% in post period. Adjusted relative risk was 2.66 (95% CI 1.0569, 6.7689). Pio to non-pio drugs switching was 1.48% in pre-period and 1.16% in post-period (relative risk not significant). Therefore, the impact of the new studies on Rosi users to switch to non-Rosi drug, relative to Pio users before and after the publication was 3.6189 (90%CI 1.051, 12.457). **CONCLUSIONS:** Consistent with prior research, the utilization of Rosi declined by more than half in the post-period. Additionally, Rosi users were three times more likely to switch to a non-Rosi drug in the post period, relative to Pio users. Therefore, our results show that the publications about safety risks had differential impact between the two drugs within therapeutic class.

**PDB64**

# A RETROSPECTIVE DATABASE ANALYSIS OF PERSISTENCE WITH INSULIN IN PATIENTS WITH TYPE 2 DIABETES ADDING MEALTIME INSULIN TO A BASAL REGIMEN

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**OBJECTIVES:** Following a commitment to an intensive glucose-lowering regimen that includes mealtime insulin is eventually required by patients taking basal insulin to maintain good glycemic control. The objective of this study was to characterize and examine factors associated with persistence to mealtime insulin. **METHODS:** Patients with diagnosed type-2 diabetes, with at least 2 prescriptions for mealtime insulin (index medication) between July 2001 and Sept 2006, were identified from a US managed care claims database. Patients were required to have 6 months pre- and 15 months post-index continuous eligibility and at least 2 basal insulin prescriptions in pre-index period. Persistence measure #1 was defined by the absence of prescription gap of greater than 90 days, with non-persistence effective the date of the last prescription prior to the 90 day gap. Persistence measure #2 required one prescription per quarter to be persistent at 12 months; persistence at 3 and 6 months were defined similarly. Logistic regression models were used to examine predictors of persistence to mealtime insulin at 12 months. **RESULTS:** Patients adding mealtime insulin to their basal regimen ( $n = 4,752$ ; 51% male, mean age = 60.3 years) mostly used insulin analogs (60%) and vial/syringe (87%). The median number of mealtime insulin prescription claims filled per patient was 2, 3 and 4 at 3, 6 and 12 months respectively, with the median time between refills being 75.5 days. Persistence to mealtime insulin was 40.7%, 30.2% and 19.1% using measure #1 and 74.3%, 55.3% and 42.2% using measure #2 at 3, 6 and 12 months, respectively. Patients initiating with human insulin were less likely to be persistent across measures of persistence ( $OR < 0.80$ ,  $p < 0.01$ ). Additional predictors of persistence at 12 months included age, copayment, mental health comorbidity and polypharmacy. **CONCLUSIONS:** Persistence to insulin therapy is poorer than one would anticipate and is significantly lower for human insulin compared to analogs.

**PDB65**

# REAL-LIFE PRESCRIPTION PATTERNS SHOW FEWER TREATMENT CHANGES WITH BASAL INSULIN ANALOGS COMPARED TO NPH IN TYPE 2 DIABETES IN THE NETHERLANDS

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**OBJECTIVES:** Using the Dutch PHARMO database, the aim was to 1) determine the percentage of type 2 diabetes (T2D) patients starting on long-acting insulin analogues versus NPH; 2) compare previous insulin experience in patients; and 3) establish the number of patients changing treatment within one year. **METHODS:** The PHARMO database includes community pharmacy drug dispensing and hospitalisation records

from approximately 2.5 million patients. Data was extracted for insulin naïve and prior insulin T2D patients initiated on basal insulin as monotherapy or as part of a basal-bolus regimen in 2004–2006. **RESULTS:** The study included 7209 new basal insulin users, of which 4792 (67%) were insulin naïve. Overall, 4728 (66%) used analogues, with similar proportions using monotherapy (67%) and basal-bolus therapy (65%). The proportion of analogue users was greater among prior insulin users: 541 of 619 (87%) for monotherapy and 1331 of 1798 (74%) for basal-bolus therapy compared with 2258 of 3702 (61%) and 598 of 1090 (55%) among naïve users. Monotherapy for naïve patients was initiated mainly by the GP (NPH 70%, analogue 59%), for prior users mainly by the internist (NPH 49%, analogue 59%), same as for basal-bolus users (NPH 67–68%, analogue 75–80%). With NPH, 22% discontinued their prescription (average of 220 days) and with basal analogues 17% (average of 230 days). Furthermore, 6% of patients on NPH and 11% with basal analogues added-on to their prescription (after an average of 119 days and 126 days, respectively). Only 17% of patients switched treatment with basal analogues compared with NPH (average of 190 days) versus 32% (average of 158 days), respectively. **CONCLUSIONS:** When new insulin treatment is initiated, analogues are more often prescribed than NPH, more frequently prescribed by Dutch internists and not discontinued or switched as frequently as NPH, indicating that basal insulin analogues give a more sustained and satisfactory result.

PDB66

#### **PAYING FOR COSTLY PHARMACEUTICALS—REIMBURSEMENT STATUS OF LONG-ACTING INSULIN ANALOGUES IN SELECTED DEVELOPED COUNTRIES**

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**OBJECTIVES:** Many aspects of the scientific, economic and political discussions on the benefit of new medicines, for which modern insulins are a pivotal example, influence recent decisions about drug reimbursement. This study was undertaken to compare the reimbursement status of long acting insulin analogues (LAIA) in several industrialized countries around the globe, where different criteria for public funding of pharmaceuticals have been used, but all include estimates of clinical effectiveness and/or cost effectiveness. **METHODS:** The study was performed based on a combination of desk research, direct contact with national diabetes stakeholders and expert review, using a pre-defined questionnaire. In the first phase, information was gathered from each country on diabetes prevalence, cost, relevant policies and guidelines through a range of sources including government and patient association websites, published scientific literature, media reports. In the second phase additional information about reimbursement status of LAIA was sought from recommendations obtained from the websites of HTA or similar agencies, or interviews carried out with national stakeholders representing health ministries, patient organisations or medical community. **RESULTS:** Fifteen countries have been included in the study (Australia, New Zealand, Canada, UK, The Netherlands, France, Germany, Austria, Sweden, Norway, Latvia, Lithuania, Estonia, Hungary, Bulgaria). Only in France LAIA are reimbursed in 65%, in all remained countries—in 100%. But in most countries there are several restrictions on access to LAIA, namely criteria for this type of treatment have been developed to respond the clinical and economic evidence (use in selected patients, application only from a relevant specialist, regular reassessments of metabolic control, listing after the company agreed to a price reduction). **CONCLUSIONS:** The story of LAIA is important not only because of the way the evidence has been interpreted, but because the voice of consultative bodies resulted in action by the health care purchasers.

PDB67

#### **HEALTH CARE UTILISATION AND EXPENDITURES ASSOCIATED WITH TREATMENTS OF DIABETES MELLITUS WITHIN THE SLOVAK REPUBLIC**

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**OBJECTIVES:** The aim of this study was to collect comparable and reliable data about consumption of drugs for treatment of diabetes mellitus in Slovakia during the period 1999–2008. **METHODS:** Data of wholesalers (following ATC/DDD), who are legally obliged provide this information to the Slovak Institute for Drug Control, was used for the analysis. The results were expressed in the numbers of the packages, finance units (€) and defined daily doses per 1000 inhabitants per day (DID). **RESULTS:** The collected data shows a significant increases in the antidiabetic's consumption from 1999 to 2008 in term of DID (in 1999 (33.34) and in 2008 (48.63)). A moderate increase in A10AB group (Insulins and analogues, fast-acting) in 1999 (3.03), in 2003 (3.47) and in 2008 (5.25), a significant decrease in A10AC group (Insulins and analogues, intermediate-acting) in 1999 (4.79), in 2003 (3.94) and in 2008 (2.20), a moderate increase in A10AD (Insulins and analogues, intermediate-acting combin.) in 1999 (2.47), in 2003 (2.71) and in 2008 (4.05), a noticeable increase in A10AE (Insulins and analogues, long-acting) in 1999 (0.05), in 2003 (0.02) and in 2008 (1.99), a dramatic increase in A10BA (Biguanides) in 1999 (4.82), in 2003 (7.66) and in 2008 (13.51), a relatively stable consumption in A10BB (Sulfonamides) in 1999 (17.57), in 2003 (15.87) and in 2008 (19.29) and a moderate increase in A10BD (Biguanides and sulfonamides in combination) in 1999 (0.52), in 2003 (0.95) and in 2008 (1.68) in term of DID can be seen from this analysis. Financial expenditures for antidiabetics were in 1999 (€19,271,000) and in 2008 (€38,952,000). **CONCLUSIONS:** Inseparable components of the Slovak drug policy must be viewed realistically with regard to the antidiabetics' consumption. Adherence to principles of diabetes

mellitus treatment's guidelines lead to fundamental short and long term financial savings within health care systems.

PDB68

#### **A RETROSPECTIVE ANALYSIS OF MEDICATION USE, RESOURCE UTILIZATION, AND CLINICAL EFFECTIVENESS OF EXENATIDE COMPARED TO GLARGINE IN PATIENTS WITH TYPE 2 DIABETES**

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**OBJECTIVES:** Exenatide and glargine are used for the treatment of type 2 diabetes (T2D) patients who are inadequately controlled on oral antidiabetic (OAD) medications. This study examined concomitant medications (including "off-label" use), resource utilization, and mean HbA1C (A1C) reduction after initiation of exenatide compared to glargine. **METHODS:** A retrospective claims analysis comprised of adult patients with T2D who initiated exenatide (N = 9264) or glargine (N = 3791) therapy between April 1, 2005 and June 30, 2007. Concomitant medications and resource utilization were estimated using logistic regression with propensity score stratification used to control for baseline patient characteristics. A subgroup analysis was performed in patients who had baseline and follow-up A1C data for exenatide (n = 606) and glargine (n = 251) to examine mean A1C reduction. **RESULTS:** A higher percentage of exenatide-treated patients were using concomitant metformin only (21.4% vs. 10.7%, p < 0.0001) and a lower percentage were using concomitant sulfonylurea only (3.2% vs. 6.4%, p = 0.001). There was no significant differences between percentage of patients using at least 1 OAD medication (89.2% vs. 88.9%, p = 0.14) in both cohorts. Exenatide-treated patients had 26% lower risk of hospitalizations (OR: 0.74, p < 0.0001) mainly due to 38% lower risk of macrovascular complications (OR: 0.62, p < 0.001). Exenatide-treated patients also experienced 22% lower risk of hypoglycemic events (OR: 0.78, p = 0.037). A higher percentage of exenatide-treated patients with a baseline A1C ≥ 7% achieved an A1C goal of < 7 (36.3% vs. 19.3%, p < 0.001). Exenatide-treated patients experienced a significantly greater mean reduction in A1C compared to glargine-treated patients after adjusting for baseline A1C (−0.80 vs. −0.52, p = 0.0142). **CONCLUSIONS:** Most patients were concomitantly using some OAD medications in both cohorts. Exenatide-treated patients had a significantly lower risk of hospitalizations, macrovascular complications and hypoglycemic events. In the patient subset with A1C data, exenatide-treated patients had a significantly greater reduction in mean A1C and higher percentage achieving goal than glargine-treated patients.

PDB69

#### **SIGNIFICANT REDUCTIONS IN POLYPHARMACY AND HEALTH CARE UTILIZATION WITH INSULIN PUMP THERAPY (CSII) IN PATIENTS WITH TYPE 2 DIABETES**

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**OBJECTIVES:** Clinical evidence evaluating polypharmacy and health care utilization with the use of continuous subcutaneous insulin infusion (CSII) in persons with uncontrolled Type 2 diabetes is limited. This study provides a real-world (retrospective) evaluation of the impact of CSII among 973 patients with Type 2 diabetes initiating CSII therapy between January 2005–October 2007 (mean age 48 years, 47% male, mean duration of follow-up 17 months). We hypothesized that CSII therapy would reduce rates of polypharmacy (multiple diabetes medication use), ER visits, and hospitalizations. **METHODS:** Administrative claims from a large, geographically diverse, US health plan were used. **RESULTS:** More than 1/3 of subjects taking oral anti-diabetic medications (OADs) before CSII initiation discontinued oral therapy altogether once they began CSII. The mean number of OADs used by subjects decreased by 0.67 OADs (1.45 OADs before vs. 0.78 OADs after, p < 0.001) after CSII initiation. The number of subjects using multiple OADs decreased by 58% (40% before vs. 17% after, p < 0.001) and rates of switching or augmenting oral therapy decreased from 44% to 25% (p < 0.001) from baseline to follow-up. The rate of ambulatory visits increased from pre- to post-CSII initiation (1.80 visits/subject/month before vs. 2.01 visits/subject/month after CSII initiation, p < 0.01), likely reflecting increased use of diabetes education services related to CSII. However, the rates of ER visits (0.11 visits/subject/month before vs. 0.08 visits/subject/month after, p < 0.01) and hospitalizations (0.03 visits/subject/month before vs. 0.01 visits/subject/month after, p < 0.01) significantly decreased after CSII initiation. **CONCLUSIONS:** Insulin pump therapy (CSII) was associated with significant decreases in polypharmacy and medication changes. Also, CSII may lead to a reduction in health care utilization as indicated by reductions in rates of ER visits and hospitalizations.

PDB70

#### **ORAL MEDICATIONS VS INSULIN FOR DIABETES: EPIDEMIOLOGICAL & HEALTH POLICY IMPLICATIONS IN GREECE**

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Diabetes is one of the most prevalent diseases of 21<sup>st</sup> century. In Greece, according to IDF, 737,700 people were suffering from diabetes in 2006 with prevalence rate 8.6% of the adult population. The Greek NHS decides reimbursement level based on disease. Nevertheless a paradox that exists in Diabetes case is that insulins are fully reimbursed whereas oral medications are reimbursed 75%. Moreover, the blood glucose measuring tapes are distributed for free in patients taking insulin, contrary to patients in oral medications that have to pay the whole amount. **OBJECTIVES:** To assess the